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RECONSTRUCTION AND EXPANSION OF REFINERY AT HEIDE, GERMANY

Dr Fritz Staiger

[Information on graphics material is appended.]

At the end of World War II, the DEA (Deutsche Erdoel-Aktiengesellschaft, German Petroleum Corporation) refinery at Heide was a heap of rubble. The plant had suffered eight heavy air attacks, in which the grounds were hit by 2,600 bombs. Nearly all installations were destroyed. In the crude-processing plant, only two topping installations were left. They were put back into operation quickly, after some makeshift repairs, and were supposed to distill crude oil from the plant-owned oil field in the immediate vicinity of the refinery. However, the auxiliary installations, such as the boiler house, workshops, tank farm, etc., had been destroyed, so that this kind of operation can be called only an improvisation.

In 1945 and 1946, restrictions and prohibitions imposed by Military Government hampered all initiative. However, reconstruction was quietly planned and the preparatory work started. The repair work was conducted under the most difficult conditions.

The two topping installations were subjected to a general overhaul and modernized. One was converted to vacuum distillation. A new boiler house was built and the workshop, which had been moved to a nearby town during the last months of the war, was rebuilt. Since this workshop now also serviced the drilling and exploitation installations of the DEA in Schleswig-Holstein, it is larger than the normal refinery workshop. It is equipped with every kind of modern machinery required.

One of the greatest bottlenecks was the loss of all tank space. This has now been remedied, and the refinery again has sufficient tank space for efficient operation.

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Until 1950, the processing capacity of the topping and vacuum distillation installations was 60,000 tons per year. The installation produced topping gasoline, kerosene distillate, diesel fuel, lubricating oil distillates, light and heavy spindle oil, light and heavy machine oil and cylinder oil, and bitumen. In 1949, a bitumen oxidation and mixing installation was built which permits the production of all types of bitumen from the bitumen obtained in the vacuum distillation. The lubricating oil distillate products are sent for further processing to the DEA Mineraloelwerke Grasbrook. This plant has been expanded by the erection of a deparaffinization installation which formerly had been operated at the DEA refinery at Wilhelmsburg and which has been rebuilt into one of the most modern installations of this kind in Germany. In addition, the Grasbrook refinery has been equipped with an Edeleanu extraction installation, so that it is now one of Germany's most modern lubricating oil refineries. It is now capable of processing the lubricating oil distillates from Heide to all desired commercial lube oil products, but also of producing specialties such as transformer oil and liquid paraffin.

After the currency reform, the exploitation activity of the DEA was intensified and production of crude oil increased. The processing plants at Heide and at Wietze no longer had sufficient capacities. At the same time, Heide was no longer able to supply the Grasbrook refinery with raw material in sufficient quantities. The DEA therefore decided to reconvert the Heide distillation installations entirely to topping operation, and to transfer the large vacuum distillation installation from the Wilhelmsburg refinery to Heide. The installation was modernized and began operating in the spring of 1951, increasing the processing capacity of the Heide refinery to 150,000 tons per year. The Grasbrook refinery could now be supplied with twice the quantity of lubricating oil distillates as before. At the time of the construction of the vacuum distillation installation, the boiler house was expanded, the bitumen oxidation installation was enlarged, and tanks, offices, tracks, roads, etc., were built. Since the whole grounds were pock-marked with bomb craters, this involved considerable earth-moving and debris removal.

The prospecting work of the DEA continued to bring good results in the subsequent years. Crude production at Heide and in the other DEA fields increased, and offered the basis for more extensive crude processing. The idea of installing a cracking plant at Heide goes back to prewar days, to the time of the first oil strikes in the region. The war prevented the realization of this project. Attempts to obtain permission for erection of a cracking installation in 1945 failed. The project was finally approved in the course of ECA planning. These plans initially aimed at a capacity which would be high enough for processing future DEA crude production. At present, the capacity is utilized by processing both imported and domestic crudes, a policy which also prevents spoliation of the domestic oil wells. In the meantime, however, DEA crude production has reached 350,000 tons per year and the trend is toward further increases, so that the Heide refinery might well be using domestic crude exclusively in the near future. With lubricating oil production adequate, crude processing was now expanded to include production of high-grade fuels.

A pier and tank installation was built at Brunsbuettelkoog for the unloading of seagoing tankers supplying the imported crude needed to fill the gap between local production and refinery capacity. The installation can handle tankers of all sizes. In the spring of 1953, two pipelines, one with a diameter of 150 millimeters and one with a diameter of 125 millimeters, both of them 31 kilometers long, will connect the refinery to the Brunsbuettelkoog installation. The pipelines will transport 1,500 tons of crude per day from Brunsbuettelkoog to Heide and 900 tons of fuel from Heide to Brunsbuettelkoog.

The cracking installation uses the thermophor catalytic cracking process of Socony Vacuum, New York. The most important parts of the installation were built in the United States, but some of the auxiliary equipment is of domestic

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manufacture. The installation has 18 individual distillation and scrubbing columns. It required installation of 28,000 meters of tubing, 36,000 meters of underground cables, and 50,000 meters of cables and electric lines for measuring instruments. The installation is completely automatic, and uses 1,500 measuring instruments, all of them of the most modern kind.

The final product is a mixture of cracking gasoline and polymer gasoline in the ratio of 9 : 1. Without leading, the octane rating of this product is 75. Although the installation is set for production of gasoline with that octane rating, it can be changed to a higher octane rating by changing the intensity of cracking. This is done, however, at the expense of the yield. By using lead additives, the 75-octane rating can be raised to that of high-octane gasoline. The gasoline shows excellent qualities as a motor fuel. It has a specific gravity of 0.724 at 20 degrees centigrade.

The yield depends on the type of crude used. When using light Heide crude, the cracking installation produces 50 percent carburetor fuel, 16 percent diesel fuel, 4 percent liquid gas, 22 percent fuel oil, 4 percent heating gas, and 3 percent coke. The installation is designed to process 300,000 tons of light Heide crude per year. However, it was shown during the first few weeks of operation that the capacity can be increased without much difficulty.

Official ground-breaking ceremonies were held 13 June 1950, and the laying of the foundations started in April 1951. The installation went into operation 29 September 1952 and its first products were drawn off 48 hours later.

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1. Location: West Germany, Land Schleswig-Holstein, Heide

Caption: "Topping and Vacuum Distillation Installations." Photograph shows over-all view of installation from an angle, at slight elevation

Photograph Description: Size, 3 1/8 x 2 1/4 inches; good; slick paper

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2. Location: West Germany, Land Schleswig-Holstein

Caption: "Bitumen Oxidation and Mixing Installation." Photograph shows over-all view of installation from the ground

Photograph Description: Size, 3 1/8 x 2 1/4 inches; good; slick paper

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3. Location: West Germany, Land Schleswig-Holstein, Heide

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Caption: "Partial View of Refinery During Construction of Cracking Installation." Photograph shows view of plant from an elevation, showing various installations under construction and layout of plant

Photograph Description: Size, 3 1/8 x 2 1/4 inches; good; slick paper

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4. Location: West Germany, Land Schleswig-Holstein, Heide

Caption: "View of Catalytic and Final Processing Installations." Photograph shows over-all view of entire installation from the ground

Photograph Description: Size, 4 3/4 x 3 3/8 inches; good; slick paper

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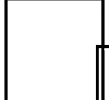
5. Location: West Germany, Land Schleswig-Holstein, Heide

Caption: "DEA-Heide Cracking Installation" View from a slight elevation

Photograph Description: Size, 2 13/16 x 2 1/8 inches; good; slick paper

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